



Heat Quantity Required

Calculate the loss of heat or transfer of heat from a room to determine the Wattage required to heat the room. Heat convection, heat radiation and heat conduction are the major sources of heat loss. The infiltration of cold air is also a major cause of heat-loss.

Heat calculations are made in BTU/hour. For electric heating, the required measurement is the WATT.

To convert the BTU/hr to WATT :

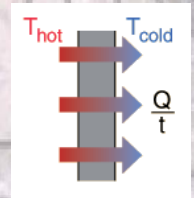
$$3.413 \text{ BTU/Hr} = 1 \text{ Watt}$$

At the base of all calculations, the basic rule of 10W/sq ft remains a good method to calculate the heating required. This applies only to 8 foot ceilings. For ceilings exceeding 8 feet, use 1.2W per cu ft.

These two calculations take into account an exterior temperature of -20 C and an interior temperature of 20 C.

The results given by these two calculations are averages only. Many factors can affect heat required, such as:

- windows
- poor insulation
- exterior temperature
- interior temperature required



$$\text{Heat Loss} = Q = (\text{surface}) \times (\text{interior temp.} - \text{exterior temp.})$$

T Thermal Resistance (R)

Thermal Resistance (R factor)

The R Factor (eg: R20) = sq ft X temperature (F)

R20 = 1/20 BTU/hr per square foot for each degree of difference

in temperature. Calculation of heat loss through walls.

For a room of 10ft X 10ft, with a ceiling of 8feet, with insulation of R20, an interior temperature of 70F and an exterior temperature of -4F (-20C to 20C).

$$\text{Heat loss} = Q = (320 \text{ pi}^2) \times (70\text{F} - -4\text{F}) = 1184 \text{ BTU/hr}$$

T 20

$$1184 \text{ BTU/hr} = 346.91 \text{ watts}$$

3.413

Note: in this example only the heat loss of the walls has been calculated. For a complete result, it is also necessary to calculate the heat loss of the floor, windows, ceiling, as they all contain different R factors.

HEAT DISTRIBUTION :

The best place to install heating units is in the location more prone to heat loss, under windows, near doors and on exterior walls. Optimum heating results will be obtained with a well installed installation and with the selection of adequate heating units.